Measuring the Impact of Knowledge Management

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ABSTRACT

An exploratory study in four selected organizations indicated that a varied set of indictors was being used for measuring the impact of knowledge management in these organizations. While their objectives of measurement differed, there were commonalities in emphasis on customers, people, and intangible assets. In the organization under study, measurement seems to be focusing on intellectual capital rather than the knowledge management processes. Suggestions have been put forwarded for developing comprehensive performance measures focusing more on the processes than the assets.

INTRODUCTION

Measuring the impact of knowledge management (KM) is important in determining the benefits that can be reaped by appropriate KM efforts. O'Dell and Grayson (1998) identified measurement as one of the key enablers in their model for transfer of best practices. They defined the measurement as the process of creating and using indicators/measures to determine how each enabler impacts the best practice transfer process within the organization. Traditionally, organizations have used financial indicators for performance measurement. These indicators, however, are not adept at capturing the measurement of the intangible impact of knowledge management practices and processes on the organization. Some organizations have tried to measure learning and knowledge through the application of a combination of indicators such as customer satisfaction, financial performance, and job satisfaction among various other measures. But most of these measures are not precise enough to assess the use of knowledge management and may only give a superficial view of the impact of KM. These measures also tend to commodify knowledge and capture it as static and tangible asset.

Recently, there have been attempts to use the Balance Scorecard (Kaplan and Norton, 2001) and the Intangible Assets Monitor (Karl Sveiby, 1996) to measure the intellectual capital. Concerns, however, have also been expressed about using these measures. Barchan (1997) has cautioned that, even though measurement is essential in knowledge management, it is better not to just simply jump on the bandwagon without giving a proper thought to what will be appropriate measures to be used. He stressed that it is pertinent to create an internal understanding of what the intangible assets are and what they mean to the overall performance of an organization (Barchan, 1998, 1999, & 2000). Martin (1999) has highlighted that there is no one set of measures applicable to all firms, and even within a company. He points out that what is being measured may change, due either to changes in the external environment or due to a change in the company's direction. Malhotra (1998) and Skyrme (1999) have stressed on the importance of understanding the role of knowledge management in business strategies of organizations before venturing into measuring the performance of knowledge management processes.

It should be useful to investigate how do organizations, that have successfully implemented knowledge management, measure the impact of their KM initiatives and in what ways other organization can take advantage of their experience. With these considerations in view, we undertook a study of selected organizations to identify and review the existing performance measures in the knowledge management area. The study was carried out at the Division of Information Studies at the Nanyang Technological University of Singapore during the first quarter of the academic year of 2001-2. This paper reports the results of this study. The study attempted to examine performance measures that were reported to be in use in organizations that were active in implementing knowledge management. The study focused on the following specific objectives:

- To identify performance measures developed for assessing the knowledge management work.
- To survey the use of performance measures by selected organizations to measure the impact of their knowledge management efforts.
- To determine the adequacy of these measures to assess the impact of knowledge management processes.

An extensive review of web sites and portals in the knowledge management area was conducted. Additional information was sought through interviews and e-mail communications for verification and validation purpose from selected organizations. Our initial review indicated that many organizations had delayed or ignored the enabler of measurement while introducing KM. This meant that even though there were many organizations that were involved in knowledge management initiatives, they did not necessarily have a performance measurement system. Using carefully designed criteria, we selected four organizations for detailed review of the use of performance measures for knowledge management. These organizations had well established knowledge management programs and hey either had web sites with comprehensive information or had local representatives who could be contacted to seek needed information. These organizations are: *FUJI XEROX*, *MICROSOFT CORPORATION*, *INFOSYS TECHNOLOGIES*, and *ARTHUR ANDERSEN*. A checklist containing major areas related to performance measurement was used to guide the data collection.

The organizations included in this study are from different industries. Each of these organizations had undertaken knowledge management initiatives to support their business. *FUJI XEROX* developed 'Eureka' to respond to the problem faced by technicians not being able to solve the problems. *MICROSOFT* developed a blueprint for the 'Digital Nervous System'. *ARTHUR ANDERSEN* focused knowledge management in the area of business consulting. *INFOSYS* introduced knowledge management as a "Learn once, Use anywhere" paradigm. The knowledge management initiatives of these organizations seem to have been guided by a clear-cut vision and appropriate value propositions. It appears from the statements on their web sites that knowledge management in these organizations was not viewed as an additional function but rather as an enabler to facilitate their internal business operations. Their knowledge management work seems to be at a level that is suitable for review of performance measurement in this area.

PERFORMANCE MEASURES USED

Our review indicated that all the organizations in the study had some sort of system in place for measuring the impact of knowledge management. The objectives of measurements and the level of sophistication of performance measures in use varied among the organizations.

In *FUJI XEROX*, the purpose of measurement was to track the progress of the Eureka system. More than 150,000 problems were solved using Eureka. In *MICROSOFT*, real knowledge management solutions began by objectively looking at the firm's strategic strengths, weaknesses and goals for clues where knowledge management would have high impact and should provide specific, measurable benefits in the critical areas of the organization. In *INFOSYS*, the main purpose was to provide a value to the off-balance-sheet assets of the company and to show the financial and non-financial parameters that determined the long-term success. In *ARTHUR ANDERSEN*, the purpose was to justify the outcome of investments in knowledge management and the resources in terms of the involvement of teams in knowledge management.

The selected organizations used a different set of performance measures but there was an element of commonality in the indicators used to measure the impact of knowledge management. *FUJI XEROX* focused in the areas of deployment, knowledge content, and productivity; *MICROSOFT* emphasized products & Services Design & Development, Business Planning, and Employment Management; *INFOSYS* selected External and Internal Environment as their main focus. *ARTHUR ANDERSEN* focused on Strategy, Process and Culture. In addition, they have an elaborate set of metrics suggested by the Working Council for the perfor5mance evaluation of knowledge management intranets. These metrics covers areas like revenue generation, opportunity cost, knowledge efficiency, data quality, Corporate intranet usage, and individual knowledge sharing behavior. Measures used by the organization included in this study are given in Table 1.

As shown in Table 1, each of the organizations had adopted and developed a different performance measurement mechanism to suit

the needs and focus areas of their knowledge management initiatives. In the case of *FUJI XEROX, MICROSOFT* and *ARTHUR ANDERSEN*, customized performance measurement systems were developed pertaining to the different focus areas. In *FUJI XEROX*, detailed measures were observed for each topic area. For *MICROSOFT*, the measures were divided among the key areas of the organization. Measures were defined in quantifiable form for the key areas of the knowledge management framework in *ARTHUR ANDERSON*. *INFOSYS* adopted already available performance measurement models.

In order to demonstrate the results of the performance measurement systems in place, various formats and techniques were used. A summary of presentation formats is given in Table 2.

Each of the selected organizations defined follow-up actions that defined the use of performance measurement results and ensured that measurement played a crucial role in the knowledge management processes. The follow-up actions are given in Table 3.

The follow-up mechanisms seem to ensure that the measurement systems continue on regular basis. These also help in further enhance and promote the knowledge sharing culture. Regular knowledge management surveys helped these organizations to assess the levels at different times and also translated the results to monetary value to justify knowledge management investments.

DISCUSSION

Despite having different performance measurement systems, there were several common elements between the systems. The main emphasis in all the systems was on the customer and this emphasized the customer orientation of the models. In *FUJI XERO,* the topic area of productivity related to the number of customer problems that were solved. In *MICROSOFT*, one of the perspectives was on customer and issue management, where customer satisfaction, needs and breadth of service coverage were measured. In *INFSYS,* the external structure related to their customers and aspects relating to customers in the growth/renewal, efficiency and stability. In *ARTHUR ANDERSEN*, the measures were also tied to the customer in that retrieving the right

Table 1: Performance measures used by selected organizations

FUJI XEROX	MICROSOFT	INFOSYS	ARTHUR ANDERSEN
Deployment # Of users connected % Of users updating weekly	**Product & Services Design & Development** Product success rate Cycle time Low design rework	**Customers (External Structure)** Growth/renewal (revenue and new customers) Efficiency (sales/customers) Stability (repeat business and sales to large customers)	**Strategy** Time saved in proposals and engagements
Knowledge content and quality # Of solutions submitted Number days taken to validate solutions	**Customer & Issue Management** Customer satisfaction Needs captured in products Breadth of service coverage	**Organization (Internal Structure)** Growth/renewal (IT and R&D investments) Efficiency (proportion of staff and sale) Stability (average age of support staff)	**Process** Number of contributions Contributors Organizing office People accessing documents Useful of documents
Productivity # Of customer problems solved % Reduction in service hours % Reduction in parts dollars Total $ saved in cost of service and support	**Business Planning** Discovering trends Crisis response times Competitive awareness Acting on complete information	**People (Competence)** Growth/renewal (education index) Efficiency (value added per employee) Stability (average age of all employees	**Culture** People reaction about knowledge management
	Employment Management & Development Education levels Training participation Skills alignments		

Table 2: Presentation of performance measurement results

FUJI XEROX	**MICROSOFT**	**INFOSYS**	**ARTHUR ANDERSEN**
Names of author and validator available in databases	Results presented and used through the Knowledge Management Platform	Intangible Assets Score sheet is used to evaluate the market worthiness of a company	Measurement of knowledge sharing behavior of staff is included as a section in the staff appraisal

Table 3: Follow-up actions for knowledge management initiatives

FUJI XEROX	**MICROSOFT**	**INFOSYS**	**ARTHUR ANDERSEN**
Worldwide Customer Service Global Program Hall of Fame for Authors (cash and trophy) and Hall of Fame for Validators (cash rewards for outing and trophy)	Use of technology as a foundation for managing knowledge assets and bringing people together in a dispersed organization	Embarked on a number of initiatives aimed at taking the prevailing knowledge sharing culture to even greater heights	Use of formula to translate knowledge management initiatives into dollars and cents to reinforce KM culture by making people see the benefits

knowledge at the right time would enable them to meet their client needs.

Another common emphasis in all the performance measurement systems was that the contribution of people was recognized as an important factor that needed to be measured. This was evident in all models used by these organizations. In *FUJI XEROX,* the three topic areas of deployment, knowledge content and quality and productivity related to the technicians involved. In *INFOSYS*, people were one of the key areas of the monitoring system in terms of their competence. Under this measure, the education index of employees, value added per software engineer and employee and the average age of employees were measured to derive a valuation of the intangible assets of the organization. In Arthur Andersen, individual knowledge-sharing behavior and the usage of the corporate intranet were measured.

KM performance measurement systems in the organization under review did take into consideration intangible factors in their measurements and attempted to quantify, where practical. For instance, *FUJI XEROX* tried to quantify the intangible factor of knowledge content and quality by measures like number of solutions submitted by country and number of days to validate the solutions. Similarly, *INFOSYS* used percentage of revenue from image-enhancing customer, sales from the five largest customers over the total revenue, and value-added per software engineer in measuring the intangible aspects of growth/renewal, efficiency ad stability in the internal and external structure and competence of people. *ARTHUR ANDERSEN*, tried to translate all the key areas of the knowledge management framework into measurable indicators, e.g., time saved in new product development/regulatory process, time to implement a best practice and number of mistakes made twice.

The performance measure used by the organization selected for this study varied. Some used established systems like the Balance Scorecard and Intangible Asses Monitor, while others developed their own systems of measurement. The emphasis was no longer solely on financial measures but on the inclusion of intervening non-financial measures. The focus however still seems to on measuring the intellectual capital and assets rather than the actual processes of knowledge management it is understandable that measuring the KM processes is a complex task and is not easily quantifiable but nonetheless important and essential to make the measurement more useful.

CONCLUSION

Measures used for assessing the KM performance by the organizations included in the study under report focused on the general aspects related to knowledge management work, e.g. infrastructure, technology, culture, and people. While useful in highlighting the value of KM in general, these measures only provided a partial assessment of the impact of knowledge management on these organizations. To provide a comprehensive coverage of the measurement of knowledge management processes, emphasis needs to be placed on examining the processes and developing measures that are more specific to measure the steps involved in these processes.

The measurement system adopted by *FUJI XEROX* for their Eureka system could be considered a step in the right direction. It does emphasize on capturing and measuring tips and sharing and using knowledge in terms of quantified statistics. Similarly, *ARTHUR ANDERSEN* demonstrated commendable efforts in converting intangible knowledge management concepts into measurable criteria. However, these performance measures should go beyond valuation of intellectual assets and the concept of intellectual capital and focus on the value of the knowledge management processes. These should help measure how different steps in these processes make a difference in the success of knowledge management efforts. Some lessons may be drawn from existing performance measurement systems like the Balance Scorecard and the Intangible Asset Monitor in terms of the perspectives and measures they highlighted. For instance, the four perspectives adopted by the BSC provide a holistic way of measuring different systems within the organization and identifying the major stakeholders. Likewise, IAM may be useful to use the valuations of intangible assets at different periods of time to see if there has been an improvement and if this could be attributed to the use and implementation of knowledge management within that organization.

REFERENCES

Barchan, Margareta**.** (1997). *Growing a knowledge company: answers o frequently asked questions about measuring & managing intangible assets.* [http://www.celemi.com/articles/texts/growingknowledge.asp]

Barchan, Margareta**.** (1998). *Capturing knowledge for business growth.* [http://www.celemi.com/articles/texts/capturingknow9811.asp]

Barchan, Margareta**.** (1999). *Measuring success in a changing environment.* [http://www.celemi.com/articles/texts/measuring success9906.asp]

Barchan, Margareta**.** (2000). *Uncovering hidden assets.* [http://www.celemi.company/ia.asp]

Kaplan, Robert S. and Norton, David P. (2001). *The strategy-focused organization: how Balance Scorecard companies thrive in the new business environment.* Boston: Harvard Business School Press.

Malhotra, Y. (1998). *Can measuring IC thwart KM initiatives?* [http://www.brint.com/wwwboard/messages/1499.html]

Martin, W. (1999). Approaches to the measurement of the impact of knowledge management programmes. *Journal of Information Science.* 26, 21-27.

O'Dell, Carla and Grayson, Jackson. (1998). *If only we knew what we know: the transfer of internal knowledge and best practice.* New York: The Free Press.

Skyrme, David. (19999). *Knowledge management - performance.* [http://www.skyrme.com/ppt/access/sld005.htm]

Sveiby, Kark-Erik. (1996). *The Intangible Assets Monitor.* [http://www.sveiby.com.au/IntangAss/CompanyMonitor.html]

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